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October 11, 1963

Dean Robert R. Sears
Humanities & Sciences
Stanford University
Stanford, California

Dear Dean Sears:

I urge the appointment of Marvin Minsky as a Professor of Computer Science, beginning in September 1964. This appointment has the enthusiastic concurrence of Joshua Lederberg, Executive Head of the Genetics Department. Minsky's salary would be shared equally between the two of us.

The first area of Computer Science at Stanford was in Numerical Analysis. With Herriot and Forsythe, we have a good nucleus, though we do need one more regular position quite badly.

The next area to be cultivated was Artificial Intelligence. This signifies the extension or simulation of human perceptual and cognitive activities in recognizing patterns, manipulating symbols, and solving problems. Included is the whole area of man-machine interaction. It is silly to think that machines will do great creative work without human interaction. I believe it is equally silly to undertake substantial quantitative or symbolic intellectual work without getting all possible help from computers. I believe that the best creative teams in most technical areas will be those so organized that both men and computers are able to contribute their best. Artificial Intelligence is a long-range endeavor, whose big pay-offs are distant but of fantastic importance. It therefore seems to me to be one of the most appropriate areas for research in a university. Success will not result simply from detailed technological work; it will require the discovery of new principles of organizing knowledge, thought, and communication.

In September 1962 we got John McCarthy at Stanford, and he has been rapidly building up our strengths in Artificial Intelligence, in time-sharing, and in programming languages. A group of students is forming around him, and some of these students will go for a Ph.D. in Computer Science as a Graduate Division Special Program. Others want a Ph.D. in Mathematics, with a

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thesis related to Artificial Intelligence. Half his salary comes from Computation Center funds, and in return he is contributing a great deal to strengthen the Computation Center in the areas of time-sharing and interaction with the Suppes projects.

We now have 44 graduate students in Computer Science. Most of these graduate students have strong interests in the non-numerical uses of computers.

Stanford's program in the non-numerical aspects of Computer Science is too large to rest solely on McCarthy's shoulders. He needs colleagues to help carry the weight of necessary teaching, research, and graduate student leadership. It seems appropriate to begin by augmenting our strength in Artificial Intelligence, rather than to start off in a new area.

The leading university centers of Artificial Intelligence have been M.I.T., and Carnegie Tech. Most computer scientists would name McCarthy and Marvin Minsky as the two leading people in the field. There are four letters in the Minsky file which help bear this out. They are from Alan Perlis, head of the Computation Center and Mathematics Department at Carnegie Tech., Hao Wang, logician and computer scientist at Harvard, Herbert Simon, head of the Business School at Carnegie Tech., and George Miller, psychologist at Harvard.

It appears that we now have a chance of getting Minsky to transfer to Stanford. He likes to work with McCarthy, and he realizes what a leader in computing Stanford seems likely to become.

A letter from Joshua Lederberg indicates the interest which the Department of Genetics has in Minsky. From a conversation with Dean Alway of the Medical School, I realize that he seriously wants to improve his School's capability in computing, and that he believes the appointment of Minsky would do much to further this goal.

Since Computer Science is inherently interdisciplinary, I look upon joint appointments as very valuable in carrying out our mission.

Minsky has been very successful with graduate students at M.I.T. His first Ph.D., Slagle, created a computing system capable of handling most of the formal problems of integration in freshman calculus. He now has several students under him.

All his critics say that Minsky has wide knowledge, and I can verify this. Consider the fact that he has been an Associate Professor of Mathematics and an Associate Professor of Electrical

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Engineering in a major university, that he publishes research in Logic, and that his knowledge of Biology is rated very well by Lederberg. All these things are over and above his being a national leader in Artificial Intelligence.

Minsky has been a leader in the field of Artificial Intelligence from the beginning and has also solved several outstanding mathematical problems of considerable difficulty. One of these, Post's problem of tag, dates from the early 20's. His paper, "Steps towards Artificial Intelligence," is the best summary of the present state of the field and the problems that are next in line for solution. He has a powerful influence on students and others who come in contact with him.

I expect Minsky's role in the Computer Science Division to be those of giving a course in Artificial Intelligence, leading graduate student Ph.D. research in the field, and of doing research and writing in the field. His presence together with McCarthy would hasten the day when we can offer a "regular" Ph.D. in Computer Science, rather than a Graduate Division Special Program.

I would expect Minsky's presence to stiffen the formal knowledge to be expected of Ph.D. candiates in Computer Science. Moreover, his past membership in the Mathematics Faculty at M.I.T. should help maintain high mathematical standards in Ph.D. theses written in the area of Artificial Intelligence.

I would expect Minsky to foster an active collaboration between two groups in the Computer Science Division--the numerical analysts (especially Golub), and the "artificial intelligentsia" (McCarthy and Minsky)--for the more intimate collaboration between computers and mathematicians in the solution of problems in analysis. The PDP-1 computer should make this very easy in the technical side.

I presume that financial matters are not really crucial in these decisions. But in fact Artificial Intelligence as a field commands very substantial backing from various governmental circles. There is no question but that Minsky would obtain substantial contractual support, support which would bring solid return to Stanford in the form of overhead.

In summary, I feel most strongly that the appointment of Minsky would strengthen Stanford's program very greatly, in both Computer Science and Medicine. I hope it can be made.

I enclose the long forms for the Advisory Board. I hope they will understand that much of our staff work was done before these forms appeared, and many of the answers to the questions

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appear in a different form in the letters by McCarthy, Lederberg, and myself.

Sincerely yours,

George E Forsythe

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